Template III: Documentation and Source-by-Source Description (SBS)

Instructions

STEP 1:	Provide Source Category Information
STEP 2:	Identify Method Choice and Description
STEP 3:	List Activity Data
STEP 4:	List Emission Factors
STEP 5:	Provide Any Necessary Comments

The purpose of this template is to assist inventory teams in documenting and reporting the origin of methodologies, activity datasets, and emission factors used to estimate emissions from each key source. Future inventory teams can refer to the completed Source-by-Source Description (SBS) for each source to determine what information was collected, how the data were obtained, and what methods were used. In addition to providing source-by-source documentation within the National Systems Report, the SBS can be used as an appendix in National Communications or companion reports to provide transparency on how emission estimates were developed. Furthermore, the SBS can serve as an important source of supporting documentation during peer review processes. Overall, the SBS documentation will reduce the amount of effort required by future teams and provide a basis for consistency in future reports.

The following template serves as an archive of the sources used to develop the greenhouse gas emissions inventory. Source leads should complete this template for each IPCC key source category identified in the IPCC Key Source Analysis.

The CD-ROM accompanying this handbook contains two versions of the templates. The first is the electronic version of this document with all sample text and instructions included in light green. The second version, without the light green text, is the one in which countries should enter country-specific data, and which they should use for preparing final reports. In the final plan, all green text should be deleted.

Step-by-step instructions are listed above. Each step is explained in detail in the corresponding section of the template.

Documentation and Source-by-Source Description (SBS)

III.1 Source Category Information

[INSTRUCTIONS: Provide information about each key source category, including the sector it belongs to, a description of the source, and details about emissions from this source in your country. A standard description from existing documents is sufficient to describe the source category. You will find descriptions of some relevant source categories from the 1996 IPCC Guidelines on page III-6.

In the Country Detail field, describe the importance of emissions in your country from a particular source category. Provide the contribution to total emissions and the historical context for emissions in your country from this source (e.g., relative importance and trends).]

Sector	Waste
Key Source Category (Note gas.)	CH_4 Emissions from Solid Waste Disposal Sites
Source Description (A standard description from existing documents is sufficient.)	Waste disposal sites consist of both managed sites (e.g., landfills) and unmanaged sites (e.g., open dumps). Disposal of solid wastes generates CH_4 as methanogenic bacteria break down organic matter in the waste. The most significant factors that affect CH_4 emissions are the disposal practice employed, composition of the waste, and such physical factors as moisture content.
Country Detail (Describe source as it relates to the country. Provide historical context for emissions from this source, such as relative importance and trends.)	CH_4 emissions from solid waste disposal are a key source by level and trend analysis. Such emissions represented around 2.8% of total GHG emissions by level analysis in the waste sector, and 76% of emissions from that sector. The average annual rate of increase of emissions from solid waste disposal for the period 1990-2003 is estimated at 3%. About half of the solid waste disposal sites in the country can be characterized as managed, and half as unmanaged. The estimated annual quantity of waste placed in solid waste disposal sites increased from about 2.8 Tg in 1990 to 4.6 Tg in 2003. Over the next several years, the total amount of municipal solid waste generated is expected to increase as the population continues to grow. The percentage of waste landfilled will likely increase as the practice of managing solid wastes in landfills spreads throughout the country. However, recycling and composting practices are increasing as well and may lessen this increase. Overall, emissions from this source are expected to increase.

III.2 Method Choice and Description

[INSTRUCTIONS: Provide information about the method used to estimate emissions from the source. List the equation used and the citation for the equation. Describe the reason(s) that this methodology was chosen, particularly if other methodologies are available (e.g., Tier 1, Tier 2). If completing this template for key sources in the current inventory cycle, describe the methods likely to be used.]

Equation (If new method used, describe variables.)	CH_4 emissions = $[MSW_T*MSW_F*Lo)-R]*(1-OX)$ $Lo = MCF*DOC*DOC_F*F*16/12$
Reference	*IPCC Good Practice Guidance 2000*, Equation 5.3
Describe How and Why this Method Was Chosen	Methane emissions from solid waste disposal on land is a key category. However, the application of the Tier 2 methodology suggested by the *IPCC Good Practice Guidance* is not yet feasible, as it relies on detailed historical data concerning the quantities produced and the characteristics of waste, management practices, and the characteristics of the various disposal sites. The lack of an integrated national system for the collection of those data, as well as the numerous unmanaged solid waste disposal sites still operating do not allow for the reliable and accurate implementation of this methodology.

III.3 Activity Data

[INSTRUCTIONS: List each activity data point used to estimate emissions from this source, including the value, units, and year. Provide a citation for this data and other relevant information, such as the date the data were provided or obtained, and either the contact name (if the data were supplied by a person) or a full citation (if the data were collected from a published source). If completing this template for key sources in the current inventory cycle, identify the data likely to be used.]

Type of Activity Data	Activity Data (Value and Units)	Year of Data	Reference	Other Information (e.g., Date obtained and data source or contact information)	Source QA/QC Procedure Adequate / Inadequate / Unknown	Are all data entered correctly into models, spreadsheets, etc.? Yes / No (List Corrective Action)	Checks with Comparable Data (e.g., At international level, IPCC defaults). Explain and show results.
Waste generation rate	1.0 kg/person/day	2003	Annual Waste Report. University of Southern Europe. 2004	www.useu.edu/awr2004. Dr. Ed Crane (Head Researcher) 1-504-253-3053	Adequate. Spoke with head researcher who explained that the document underwent extensive peer review.	No. 10.0 kg/person/day was entered. Changed to 1.0 kg/person/day in all models, spreadsheets, and text.	Checked with IPCC defaults. IPCC default value 0.38 tonnes/cap/year. The Emission Factor (EF) used, 1.0 kg/person/day, equals 0.365 tonnes/cap/year. Our EF is very similar to the default value, but slightly lower, which makes sense given that packaged foods and goods constitute a smaller fraction of our market than the regional average. Other sources for data comparison not readily available.
Population	X persons	2003	Country Census Bureau	…	…	…	…

III.4 Emission Factors

[INSTRUCTIONS: List each emission factor used to estimate emissions from this source, including the value and units. Provide a citation for this data and other relevant information, such as the date the emission factor was obtained, and either the contact name (if the data were supplied by a person) or a full citation (if the data were collected from a published source). If completing this template for key sources in the current inventory cycle, identify the emission factors likely to be used.]

Type of Emission Factor	Emission Factor (Value and Units)	Reference	Other Information (e.g., Date obtained and data source or contact information)	Source QA/QC Procedure Adequate / Inadequate / Unknown	Are all data entered correctly into models, spreadsheets, etc.? Yes / No (List Corrective Action)	Explain how this emission factor is appropriate to national circumstances. Provide sources.
Methane Correction Factor (MCF)	1.0 (managed semi-aerobic), and 0.8 (unmanaged, deep)	2000 IPCC Guidelines for National Greenhouse Gas Inventories. Chapter 5, Table 5.1.	www.ipcc.ch	Adequate. IPCC guidance was reviewed by international experts.	Yes. Transcription is correct (check person should note initials, i.e., M.W.).	An annual nation-wide study of waste determined that 50% of country's SWDS are managed semi-aerobically and the remaining SWDS are unmanaged and deep. Annual Waste Report. University of Southern Europe. 2004.

III.5 Comments

[INSTRUCTIONS: Provide any other relevant information for this source category that would increase transparency of the emission estimates from this source. Examples include QA/QC activities performed, notes on reporting and documentation, and data quality.]

Comments

Descriptions of Select Source Categories

[INSTRUCTIONS: Use this table to provide descriptions of common source categories required in Step 1.]

Source Category	Sector	Description
CO_2 Emissions from Energy Industries	Energy	Fuel combustion in energy industries, also called the energy and transformation sector, consist of two principal groups of activities: (1) the production of heat for sale or for electricity generation and (2) the combustion of fuels to support the main energy extraction or production business of the enterprise; for example, use of refinery gas for heating distillation columns, or use of colliery methane at mines for heating purposes. CO_2 emissions from fuel combustion are primarily dependent on the carbon content of the fuel. CO_2 from energy activities can be estimated from energy supply data, with a few adjustments such as for unoxidized carbon.
CO_2 Emissions from Manufacturing Industries and Construction	Energy	This category consists of CO_2 emissions from fuel combusted in the industrial sector, for processes such as iron and steel, cement, aluminum, and chemical manufacturing. CO_2 emissions from fuel combustion are primarily dependent on the carbon content of the fuel. CO_2 from fuel combustion can be estimated from energy supply data, with a few adjustments such as for unoxidized carbon. This source category does not include CO_2 emissions from industrial processes.
CO_2 Emissions from Mobile Combustion: Road Vehicles	Energy	CO_2 is emitted from fuel consumed by road vehicles, such as passenger cars, motorcycles, and trucks. CO_2 emissions from fuel combustion are primarily dependent on the carbon content of the fuel. CO_2 from fuel combustion can be estimated from energy supply data, with a few adjustments such as for unoxidized carbon.
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	Agriculture	Methane is produced in herbivores as a by-product of enteric fermentation, a digestive process by which carbohydrates are broken down by microorganisms into simple molecules for absorption into the bloodstream. Both ruminant animals (e.g., cattle, sheep) and some non-ruminant animals (e.g., pigs, horses) produce CH_4, although ruminants are the largest source since they are able to digest cellulose, a type of carbohydrate, due to the presence of specific microorganisms in their digestive tracts. The amount of CH_4 that is released depends on the type, age, and weight of the animal, the quality and quantity of the feed, and the energy expenditure of the animal.
CO_2 Emissions From Cement Production	Industrial Processes	Carbon dioxide emitted during the cement production process represents the most important source of non-energy industrial process of global carbon dioxide emissions. Carbon dioxide is produced during the production of clinker and intermediate product from which cement is made. High temperatures in cement kilns chemically change raw materials into cement clinker (grayish-black pellets about the size of 12 mm-diameter marbles). Specifically, calcium carbonate ($CaCO_3$) from limestone, chalk or other calcium-rich materials is heated, forming lime (calcium oxide or CaO) and carbon dioxide in a process called *calcination* or *calcining*: $CaCO_3$ + Heat **à** CaO + CO_2.

Source Category	Sector	Description
N_2O (Direct and Indirect) Emissions from Agricultural Soils	Agriculture	Emissions of N_2O from agricultural soils are primarily due to the microbial processes of nitrification and denitrification in the soil. Three types of emissions can be distinguished: direct soils emissions, direct soil emissions of N_2O from animal production (including stable emissions reported under Manure Management), and indirect emissions. Increases in the amount of nitrogen added to the soil generally result in higher N_2O emissions. Direct soil emissions may result from the following nitrogen input to soils: (1) synthetic fertilizers, (2) nitrogen from animal waste, (3) biological nitrogen fixation, (4) reutilized nitrogen from crop residues, and (5) sewage sludge application. In addition, cultivation of organic soils may increase soil organic matter mineralization and, in effect, N_2O emissions. Direct soil emissions of N_2O from animal production include those induced by grazing animals. Emissions from other animal waste management systems are reported under "Manure Management." Indirect N_2O emissions take place after nitrogen is lost from the field as either NO_x or NH_3, or after leaching or runoff.
CH_4 Emissions from Solid Waste Disposal Sites	Waste	Waste disposal sites consist of both managed sites (e.g., landfills), and unmanaged sites (e.g., open dumps). Disposal of solid wastes generates CH_4 as methanogenic bacteria break down organic matter in the waste. The most significant factors that affect CH_4 emissions are the disposal practice employed, composition of the waste, and such physical factors as moisture content.